SNOWFALL.

The total monthly snowfall at each station is given in Table II; its geographical distribution is shown on Chart V. This chart also shows the isotherm of minimum 32° and of minimum 40° for the air within the ordinary instrument shelter. The former isotherm is an approximate limit to possible snow, while the latter is an approximate southern limit to the regions that report frost on exposed localities.

The *depth of snow on the ground* at the end of the month is given in detail in Table II, and for the winter months is also shown on Chart VI. The condition of the snow on the ground and of the ice in the rivers on Monday of each week, is also shown on the weekly charts of the Climate and Crop Service, published by the Weather Bureau during December to March, inclusive.

Snowfalls of from 12 to 20 inches were reported for October in southwestern Nebraska, Colorado, and northern New Mexico; 6 to 12 inches in North and South Dakota; 6 to 14 inches in northern Michigan, and light snows or "traces" in New England, New York, Pennsylvania, Ohio, West Virginia, Indiana, Illinois, Wisconsin, Minnesota, Iowa, and Kansas, as also in the middle and northern Rocky Mountain Plateau Region.

HAIL.

The following are the dates on which hail fell in the respective States:

Arizona, 1, 2, 11, 12, 27. Arkansas, 20, 22. Colorado, 7, 8, 9. Illinois, 16, 18, 19, 29. Indiana, 17, 19. Iowa, 9, 28, 29. Kansas, 28. Louisiana, 20, 21. Minnesota, 8, 16. Missouri, 28. Nevada, 27. New Hampshire, 8. New Mexico, 4, 6, 7, 9, 12, 13, 21, 28. North Dakota, 27. Oklahoma, 27. Oregon, 31. Tennessee, 12. Texas, 19, 21, 28. Utah, 27, 28. Washington, 31.

SLEET.

The following are the dates on which sleet fell in the respective States:

Colorado, 29. Illinois, 17, 19. Indiana, 18. Iowa, 17, 30. Kansas, 23. Massachusetts, 17. Michigan, 6 to 9, 17, 18, 19, 23, 24. Minnesota, 30, 31. Montana, 9, 27. Nebraska, 5, 28, 29, 30. New Mexico, 27. New York, 7, 18, 19, 21, 22. North Dakota, 17, 26, 27. Pennsylvania, 18. South Dakota, 17, 28 to 31. Utah, 27, 28. Washington, 31. West Virginia, 17. Wisconsin, 16, 18, 19, 31.

WIND.

The *prevailing winds* for October, 1896, viz, those that were recorded most frequently, are shown in Table I for the regular Weather Bureau stations.

HIGH WINDS.

Maximum wind velocities of 50 miles or more per hour were reported during this month at regular stations of the Weather Bureau as follows (maximum velocities are averages for five minutes; extreme velocities are gusts of shorter duration, and are not given in this table):

Stations.	Date.	Velocity.	Direction.	Stations.	Date.	Velocity.	Direction.
		Miles				*Miles*	
Block Island, R. I	11	72	ne.	Fort Canby, Wash	29	60	s.
Do	12	78	ne.	Do	30	66	s.
Do	13	68	ne.	Hatteras, N. C	11	67	n.
Do	15	51	ne.	Kittyhawk, N. C	10	60	ne.
Boston, Mass	12	50	ne.	Do	11	72	ne.
Chicago, Ill	29	62	s.	Do	12	56	nw.
Do	30	51	sw.	Nantucket, Mass	11	50	ne.
Duluth, Minn	30	55	ne.	Do	12	60	ne.
Eastport, Me	24	58	s.	Tatoosh Island, Wash.	30	52	s.
El Paso, Tex	13	50	nw.	Winnemucca, Nev	31	50	sw.
Fort Canby, Wash	28	60	s.				

The *resultant winds*, as deduced from the personal observations made at 8 a. m. and 8 p. m., are given in Table IX. These latter resultants are also shown graphically on Chart IV, where the small figure attached to each arrow shows the number of hours that this resultant prevailed, on the assumption that each of the morning and evening observations represents one hour's duration of a uniform wind of average velocity. These figures indicate the relative extent to which winds from different directions counterbalanced each other.

SUNSHINE AND CLOUDINESS.

The quantity of sunshine, and therefore of heat, received by the atmosphere as a whole is very nearly constant from year to year, but the proportion received by the surface of the earth depends upon the absorption by the atmosphere, and varies largely with the distribution of cloudiness. The sunshine is now recorded automatically at 20 regular stations of the Weather Bureau by its photographic, and at 25 by its thermal effects. At one of these stations records are kept by both methods. The photographic record sheets show the apparent solar time, but the thermometric records show seventy-fifth meridian time; for convenience the results are all given in Table XI for each hour of local mean time.

Photographic and thermometric registers give the duration of that intensity of sunshine which suffices to make a record, and, therefore, they generally fail to record for a short time after sunrise and before sunset, because, even in a cloudless sky, the solar rays are then too feeble to affect the self-registers. If, therefore, such records are to be used for determining the amount of cloudiness, they must be supplemented by special observations of the sky near the sun at these times. The duration of clear sky thus specially determined constitutes the so-called twilight correction (more properly a low-sun correction), and when this has been applied, as has been done in preparing Table XI, there results a complete record of the clearness of the sky from sunrise to sunset in the neighborhood of the sun. The twilight correction is not needed when the self-registers are used for ascertaining the duration of a special intensity of sunshine, but is necessary when the duration of cloudiness is alone desired, as is usually the case.

The average cloudiness of the whole sky is determined by numerous personal observations at all stations during the daytime, and is given in the column "average cloudiness" in Table I; its complement, or percentage of clear sky, is given in the last column of Table XI.

COMPARISON OF DURATIONS AND AREAS.

The sunshine registers give the *durations* of effective sunshine whence the duration relative to possible sunshine is derived; the observer's personal estimates give the percentage of *area* of clear sky. These numbers have no necessary relation to each other, since stationary banks of clouds may obscure the sun without covering the sky, but when all clouds have a steady motion past the sun and are uniformly scattered over the sky, the percentages of duration and of area agree closely. For the sake of comparison, these percentages have been brought together, side by side, in the following table, from which it appears that, in general, the instrumental records of percentages of durations of sunshine are almost always larger than the observers' personal estimates of percentages of area of clear sky; the average excess for October, 1896, is 7 per cent for photographic and 5 per cent for thermometric records.

The details are shown in the following table, in which the stations are arranged according to the greatest possible duration of sunshine, and not according to the *observed* duration as heretofore.